ECONOMIC ASPECTS OF FOREST POLICY IN LITHUANIA

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Environment Discussion Paper No. 13
April 1996

C4EP PROJECT
Central and Eastern Europe Environmental Economics and Policy Project

This paper was sponsored by the Harvard Institute for International Development (HIID) under a cooperative agreement with the U.S. Agency for International Development.

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Preface and Acknowledgments

Research for this report was carried out during August and September, 1995 in Santa Barbara and in Vilnius, Lithuania. Much of the data, institutional information, and impressions obtained were gathered during a series of 17 interviews with government officials and private parties who are directly involved in, or affected by, Lithuanian forest policy. A list of the individuals interviewed appears at the end of this report. Documents gathered and consulted for data, and institutional information on the forest sector are cataloged in the Bibliography.

Completion of this project would not have been possible without the participation of several individuals. Randall Bluffstone of HIID in Vilnius had general oversight responsibilities for the project and participated directly in interviews, information gathering, and analysis. He also contributed directly to the final report through comments and suggestions that improved it significantly. Lina Kalendarite of the Ministry of Environmental Protection provided expert assistance in translating laws, regulations, and other written materials into English. Virginia Mikelinskaite, also of the Ministry of Environmental Protection, participated in most of the interviews, both in translating and in posing questions to elicit needed information.

Special thanks and recognition are due to Mante Lenkaityte for assistance in numerous tasks. These included excellent verbal translations during interviews, translation of written material, and management of schedules, logistics, and other matters.

1. Introduction and Summary

Thirty percent of the land area of Lithuania is covered with forests. This land is a vast, valuable resource, owned by the Lithuanian people. The central purpose of this study was to determine whether this resource is earning any rent, or net income, for the citizens of Lithuania. At first glance, it might seem that the answer is obviously yes. This land produces timber, used both domestically to produce wood products and exported, that generates revenues and provides jobs for Lithuanian workers. Yet growing and harvesting timber use scarce resources, land, labor, and equipment, that could be used to produce other goods and services. The value of these foregone goods and services is reflected in the costs of inputs now used in forestry. The relevant economic question is whether any net income remains, after all costs are paid, as a return for the huge land area now devoted to commercial forestry.

The answer, it appears, is that very little rent is generated at present. The reason lies partly in the system used to finance the forest industry in Lithuania, and partly in the system of ownership now in place. Forests are owned and operated for commercial wood production by state enterprises. These enterprises operate on a zero profit basis and are excluded from paying most taxes. Thus revenues equal costs on average, and costs exclude any payment for use of the land they occupy. This financing system does not allow the generation, or capture by the state, of rent on forest lands. Of equal importance, no profit motive is present to induce these enterprises to maximize the value of forest outputs produced, or to ensure that the costs of producing them are minimized.

Judging from responses in interviews, Lithuanians who are either involved in or affected by the forest industry seem broadly aware that a problem exists. To some degree this may reflect the general process of transition. Institutions governing all aspects of economic activity are evolving rapidly in Lithuania since the collapse of the Soviet Union and independence in 1991. The forestry sector is no exception. State owned forest lands are being privatized, state enterprises engaged in logging and wood processing are coming under scrutiny, the system for financing forestry activities is changing, and prices are adjusting rapidly as Lithuania's forest industry becomes integrated with world markets.

Despite the appearance of change, however, many aspects of the Lithuanian forest sector continue to operate much as they did under Soviet rule. Indeed, the absence of change in forest policy was a recurring complaint heard in interviews with private and public officials. Some expressed no dissatisfaction with the forestry, or forest growing, activities of the Ministry of Forestry, but were adamant that commercial activities should

be handled separately, by businessmen. Others expressed discontent with forest policy as well, complaining that harvest ages, harvest volumes, and the like are determined entirely by physical principles rather than economic or business considerations. Those who defend the current structure, which integrates all aspects of forest growing and harvesting in state enterprises, claimed that private firms would not act responsibly toward Lithuania's forests if given control of them. Some predicted that private forest owners would fail to reforest harvested tracts, or that private enterprise harvesters would not take sufficient care to avoid damaging forests during harvests. Yet even within the Ministry of Forestry, some expressed the opinion that the essential role of the Ministry is forestry and forest growing, and that harvesting and sales of timber probably could probably be privatized.

The remainder of this report combines the results of interviews with information gathered from other sources and interprets it from the perspective of economics. It surveys forest industry institutions in Lithuania since independence, evaluates key aspects of Lithuanian forest policy, and offers recommendations.

The main recommendation for short run policy change is to impose a tax on harvests by state forest enterprises. The proposed tax is intended primarily to generate some net income or rent on state-owned forests. This is an interim proposal, however, and it does not address fundamental issues. In the long run, the economic potential of Lithuania's forests will not be realized under the current ownership, management, and operating structure now in place, nor by the policy changes now in process. Due to constraints and limitations in the ongoing policy of privatizing forest land, the gains realized by this privatization initiative are expected to be only a fraction of what would otherwise be possible. Further, the absence of a profit motive in the operation of State Forest Enterprises results in low productivities, both in forest growth and in harvesting. This is not expected to change so long as state enterprises dominate this industry.

2. The Situation Since Independence

The evolution of forest resources and the wood processing industry under Soviet rule were guided by Soviet economic plans and the internal system of prices the planning agencies used. The result was not necessarily well-suited to Lithuania's factor endowments and to the world market conditions that Lithuania faced at independence in 1991. Since independence there have been some areas of rapid change and other areas where change has been slow or nonexistent. The areas of greatest change in forest and

wood producing sectors seem to be in the market for harvested wood and in the wood processing industry. Changes in forest use and the institutions that govern it have been slow by comparison.

Forest Cover and Productivity[1]

As of 1995, forest land in Lithuania amounted to 1,904 thousand hectares. This is 30.4 percent of the total land area of Lithuania, and an additional 1.9 percent is classified as 'other woodland'. About 97 percent of forest land is stocked with forest at any moment, the remainder awaiting restocking. Not all of this land is classified in land use regulations for commercial forestry, as the description of institutions that follows explains. The predominant species in stocked forests are pine (37.4 percent,) spruce (24.2 percent,) and birch (19.3 percent). The remaining 18.9 percent consists of black and white alder, aspen, ash, oak and other species.

Lithuania's forest stands increased in density under Soviet management, and are now rather heavily stocked. While restocking was rapid in the 1960s and 1970s, the restocked areas were poorly maintained. Many stands are now over-stocked, and face risks of damage from snow and wind.[2] The average volume of growing wood in state forests was 180 m^3/ha in 1993, compared to 88 m^3/ha in 1961. According to the Lithuanian Forest Sector Development Programme (1993, p. 15 ff.) the age distribution of Lithuania's forests is uneven, with gaps corresponding to past periods of heavy cutting.

The fraction of Lithuanian forest stands classified as 'mature' has risen rapidly in recent year--9.6 percent in 1993 compared to 5 percent in the mid 1980s. It is important to note, however, that the concept of maturity applied in these statistics is based on purely physical criteria, independent of economic considerations. As noted later, the ages of maturity are actually written into law. Reforestation, which averaged 10,000 ha/year in the 1970s and 1980s, was about 6,100 ha/year during 1991-1995.

Over the last decade, forest biomass growth has been about 9.6 million m^3 per year. Total removals have averaged 3.2 million m^3 per year.[3] Noting the heavy stocking and old ages of Lithuania's forests, and relatively low harvest volumes, the Swedish Agency for Technical and Economic Cooperation proposed a radical increase in the

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[1]Most data on forest cover and productivity are taken from unpublished charts, graphs, and tables made available by the Lithuanian Institute of Forestry.

[2]See Republic of Lithuania, *Forest Sector Development Programme*, pp. 15 ff.

[3]Removals temporarily reached 4.5 million m^3 in 1993 as a consequence of sanitary harvests of wind damaged trees.

harvest rate.[4] This agency calculated that an increase in harvests to 5.5 million m^3 per year was possible for the period 1993-2002, and further increases up to 10 million m^3 would be feasible thereafter.

Forest Institutions[5]

Forest land in Lithuania is divided into four categories. Category I (2 percent of forests) is nature reserves, with no cutting allowed. Category II (5.8 percent of forests) is forest parks, resorts, and other park-like areas. Cutting is allowed only for sanitary or aesthetic reasons. Category III (14.9 percent of forests) contains watershed, erosion zones and other sensitive environmental areas. Management is primarily for environmental goals, and cutting is restricted to thinning and small clear cuts. Category IV (77.3 percent of forests) is managed for commercial forestry.

Forest policy in Lithuania is implemented by the Ministry of Forestry, established in 1947 under Soviet rule. The Ministry oversees 43 state forest enterprises (SFEs) and 5 national parks. It also maintains forest science facilities and seed control stations. Two other forest-related organizations, the Lithuanian Forest Management Institute and the Lithuanian Institute of Forestry (LIF), are independent of the Ministry.

Forest enterprises are highly integrated, state-operated firms. They are responsible for forest propagation, management, and protection. They also carry out logging on state land, wood processing in state saw mills and operation of timber yards, repair shops, fire control stations, and forest nurseries. Forest enterprises are divided into forest districts, and these are subdivided into forest guard sectors.

The financing of state forestry and harvesting operations is important to the economic aspects of Lithuania's forest industry, and financing institutions have changed rapidly in recent years. Prior to 1991 and independence, Lithuania's Ministry of Forestry applied to the central government for an operating budget.[6] In 1991 the system was changed and a 'forest growing fund' was established. SFEs were charged prices, determined administratively, for stumpage they harvested. These stumpage fees were collected by the forest growing fund and used by the SFEs to cover costs of forest propagation, protection, and management, i.e., their 'forestry', as opposed to 'commercial' activities. SFEs earned revenue from sales of harvested round wood, from finished wood

[4]See Republic of Lithuania, *Forest Sector Development Programme*, p. S2.

[5]Most of the information in this section was obtained in interviews and in Mizaras (1993a, 1993b) and Ministry of Forestry, 1994.

[6]The primary sources for information on financing are interviews with individuals in the Ministry of Forestry and Mizaras (1993b).

products produced in SFE saw mills, and from sales of SFE stumpage to private harvesters. These revenues, less stumpage fees paid to the forest growing fund, were used to cover the 'commercial' costs of SFEs--costs of harvesting, processing, and taxes.

Under this regime (1991-1994) SFEs were liable for payment of a general excise tax levied on all businesses. In May 1994 the general excise tax was replaced by a value added tax (VAT) levied at 18 percent on all businesses. SFEs are still subject to this tax. Until early 1995 SFEs paid a profits tax, at 29 percent, which is also levied generally on Lithuanian businesses. In early 1995, this profits tax was dropped for SFEs, but remained in place for other businesses. At about the same time, the fund for forest growing was abolished. All revenues and expenses of SFEs are now allocated through a single 'forest fund', without the distinction between amounts that can be spent on commercial versus forestry activities. A general 1.5 percent property tax is not applied to SFE forest land.

To summarize the present situation, SFEs earn revenue from round wood sales, from sales of stumpage to private harvesters, and from sales of wood processed in state saw mills. This revenue, less a VAT liability assessed at 18 percent, must be used to support the commercial and forestry activities of the SFEs and the Ministry of Forestry--none is transferred to the central government.

Recent Forest Laws

Four important laws relating to the management, financing, use, and regulation of Lithuanian forests were adopted in 1995. One of these concerns the use of private forest land and is surveyed in the section on privatization that follows. The remaining three are briefly described in this section.

Resolution No. 369 of the Republic of Lithuania (March 14, 1995) spells out exemplary statutes, or articles of incorporation, for the formation of SFEs. This law and the individual SFE statutes it authorizes appears mainly to codify, formally, the pattern of operations and structures that SFEs had practiced traditionally up to that point. The exemplary statute defines the objective of SFEs as management, protection and use of SFE land according to multiple use, sustainable forestry principles.[7] The statute defines the duties and activities of SFEs to include reforestation, rehabilitation of forests, commercial and sanitary harvests for timber production, renting of forest land for hunting, food gathering, and other uses, protection of forests from fires, pests, and illegal cutting. It also authorizes SFEs to define cutting areas, to sell uncut and harvested timber, to

[7]At a practical level, this appears to mandate the German forestry principles that SFEs have practiced traditionally.

process timber and perform other commercial activities in SFE facilities. SFEs may make contracts, buy, sell and mortgage property, and define prices for goods and services they produce.

Significant restrictions are that SFEs cannot buy, sell, or mortgage forest land. Also, the Ministry of Forestry retains the right to set prices and fees for products sold, to establish 'norms' for setting salaries and for remuneration of costs of forest planting and rehabilitation. The Ministry of Forestry also sets salaries of managers and specialists. While the Ministry seemingly has significant formal control over the operation of SFEs, it is not clear that this is exercised to any great degree -- the individual SFEs appear able to operate independently.

Resolution No. 474 of the Republic of Lithuania (April 4, 1995) broadly defines the 'forestry fund', the main financial account in which the activities of the SFEs and the Ministry of Forestry are handled. This law is significant, at least symbolically, because it replaced an earlier financing system in which funds for 'forest growing' and 'forest harvesting' were separated. Revenues and expenditures for both activities are now combined, with the implicit requirement that total revenues roughly equal total expenditures over the long run. The new forest fund has two components, a general component and a central component. The central component is relatively small, and supports the operation of the Ministry of Forestry's operations at its central offices. It is also used to balance profits and losses among individual forest enterprises.

The general component of the fund operates much as a bank account for the individual SFEs. It receives revenue from sales by SFEs of stumpage and raw timber, as well as fees for indirect forest uses such as hay making and food collection. The SFEs have broad discretion in use of these revenues to cover the costs of their activities, subject to general constraints spelled out in the forest fund law. Sales of processed wood from SFE saw mills are handled by separate accounts.

Forest fund revenues may be spent on the general forestry activities of SFEs, e.g., planting, rehabilitation, management, and protection of forests, and on commercial activities, e.g., harvesting. Expenditures for processing wood may come from this fund only if revenues from sales of the processed items is paid into the forest fund.[8] Allowed expenditures from the forest fund include payment of salaries, construction of facilities and roads, payment of taxes, and other expenses. There is no authorization for disbursement of any net income to stockholders or other private owners (there are none)

[8]This generally excludes expenditures for activities of SFE saw mills, and includes only activities related to providing indirect forest products such as hay making, food gathering, and the like. SFE sawmills have separate financial accounts, and pay taxes more like private businesses.

or to the central government. Each year SFEs must obtain Ministry of Forestry approval for planned expenditures from the forest fund for the following year.

Resolution No. 965 of the Republic of Lithuania (July 11, 1995) governs the selling of uncut forests (stumpage) on state lands, and applies whether these lands are controlled by the Ministry of Forestry or another government agency. It states that the annual rate of 'main cuttings', which excludes thinning and sanitary selective cuts, is to be established by the Ministry of Forestry. It requires non-SFE timber producers, that is private harvesters and other public enterprise harvesters, to obtain licenses before any harvests can take place. These licenses are granted by SFEs and specify the volume and methods of cutting allowed, controls on site cleaning and pest suppression, and the location where the volume of harvests is to be measured. In cases where state forest stumpage is sold to non-SFE harvesters, rather than being harvested by SFEs, the law requires that sales be by auction for main cuts of the most important species. Thinning and sanitary cuts, as well as cuts of some minor species, are to be made at prices determined administratively by the Ministry of Forestry and the State Office of Competition and User Rights Protection. In addition, individual SFEs may approve sales at 50 percent of these prices for farmers who have approval of a local farming association. Finally, the statute also spells out two pages of fines and penalties for violating regulations concerning the method and volume of harvests. The primary importance of this legislation is in the requirement that main cuts be sold at auction and thinning cuts at administratively determined prices. In this regard, it is worth noting that most harvests by private firms are thinning and sanitary cuts.

Privatization of Forest Land[9]

When the Soviet Union annexed Lithuania, all forest land in the country came under state ownership and control. Just prior to this event, state forests amounted to about 81.5 percent of all forests in Lithuania. Since independence in 1991 some of the forest land owned by private parties prior to nationalization has been returned. The forest land returned is limited to plots of 25 hectares or less. Among the plots of land actually returned, 54 percent have less than 3 hectares of forest and the average forest plot size is about 5 hectares. The amounts of forest land returned to pre-war owners, by year, are: 8,000 ha in 1991, 40,000 ha in 1992, 34,000 ha in 1993, and 78,000 ha in 1994. It is expected that 500,000-600,000 ha eventually will be returned under this program.

[9]Information reported in this section comes primarily from Kairiukstis, Kenstavicius, and Markevicius (1994), Mizaras 1993a, Lithuanian Institute of Forestry data, Gaizutis and Mizaras 1994, and interviews with Mr. Zuravlas and Mr. Mizaras.

Individuals seeking to reclaim SFE land apply to the Lithuanian Institute of Forestry for a proposal, which is then presented to the Ministry of Forestry for approval. The process is said to be slowed by problems in identifying and verifying the claims of former owners.

Since independence, private harvesters have emerged to cut and sell timber growing on both state and private forest land. In 1994 private harvesters cut 1,463.7 m m^3 of wood on SFE land plus 165 m m^3 on private land. The total amounts to 39 percent of the total 1994 harvest (4,158.7 m m^3.) Private harvests on SFE land are largely confined to thinning and sanitary cuts.[10]

Resolution No. 825 of the Republic of Lithuania (June 14, 1995) regulates the management and use of privately owned forest land. Its most important features are: (i) a requirement that owners of forest stands adopt a detailed forest management plan, to be approved by the Ministry of Forestry; (ii) limitations on forest harvests and harvesting methods on private land in Categories I-III (defined earlier); (iii) detailed regulations on harvest methods and methods for commercial forest land, Category IV; (iv) specification of reforestation requirements and fire and pest control responsibilities of forest owners; and (v) general constraints on the land uses allowed on returned parcels. This statute is significant because it indicates the degree to which returned lands are actually "owned" by the private parties who receive title to them, and determines the degree to which use of these lands will in the future be guided by market forces as opposed to administrative decrees. This law is evaluated in more detail in a later section.

3. Economic Principles of Forest Management

The economics of timber production and forest management is treated in numerous publications so a detailed discussion is not needed here.[11] The following exposition just notes the main considerations. At a basic level, the analytical viewpoint and methods economists apply to forestry are no different than those applied to other resources. Forests are resources, capable of being allocated in different ways to produce a variety of final products. The fundamental economic problem is to identify conditions under which managers will operate forests in ways that produce the maximum value to society, net of the cost of inputs needed to produce that value. This involves choosing the

[10]This is about 85 percent of the total private harvest, according to Ministry of Forestry, 1994, *Misku Ukio* . . . pp. 8, 9.

[11]Hyde and Newman (1991) provide a brief discussion and Bowes and Krutilla (1989) a far more detailed treatment.

mix of products correctly, and achieving efficiency in the methods used to produce that mix.

On land used exclusively to grow forests, one aspect of this problem is the choice of rotation ages to apply to individual species. Foresters tend to regard this as a purely physical problem. If the objective is to maximize the net value of forest outputs, however, then rotation ages clearly must depend on the cost of replanting relative to the price of output obtained (net of harvest cost). For example, an increase in the relative cost of replanting naturally implies that longer rotations are optimal. One way in which forestry is special is in the very long time spans required to obtain mature output. In this sense, forests are very long term investments and the rate of interest forest owners can earn on alternative investments clearly is important in determining the optimal harvest age. The costs of protecting forests against fires and infestations, and the probabilities of such events occurring, also are determinants of the optimal rotation age, as are the costs and productivities of investments in silviculture. Changes in any of these factors, timber prices, replanting costs per hectare, harvest costs, interest rates, etc., will alter the rotation age that maximizes the forest's net economic value. An application that illustrates this principle is the observation that net forest values are generally higher if owners respond to fluctuations in prices of harvested wood, shortening rotations when prices rise and lengthening them when prices fall, than by using an 'even flow', or allowable cut, harvest policy that ignores such fluctuations.[12]

A second consideration is the land use decision. Whether society benefits more from having forestry or some other activity occupy a specific parcel of land is an economic question, not one that can be decided by purely physical or biological considerations. The simplest prescription is that a given parcel should not be used for commercial forestry unless the revenue it produces can offset all of the identifiable costs of forest growth and harvesting. Here, the costs must include any rent the land could earn if employed in some alternative use, e.g., agriculture.[13]

A third consideration is that forests may well yield non-commercial benefits that no private forest owner can capture. Examples are benefits due to providing watershed, game habitat, or aesthetic amenities for local populations. Such benefits can provide a rationale for subsidizing some aspects of private forestry, for regulating the actions of

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[12]See Brazee and Mendelsohn (1988).

[13]While seemingly simple, this prescription has repeatedly been ignored by the U.S. Forest Service, which has managed vast tracts of forest land for commercial timber production when they perpetually earn economic losses. After many attempts to induce the agency to change its behavior, an apparently frustrated President Clinton abruptly removed the head of the U.S. Forest Service in 1994 for his unwillingness to pay attention to economic principles in forest management.

private forest owners, or in extreme cases where non-commercial values dominate, for state ownership of forests.

This brief outline is intended only to indicate the general set of issues addressed in the extensive literature that now exists on the economics of forest management. These issues appear prominently in the evaluation of Lithuanian forest policy that follows. The general principle that forest management should be directed toward the goal of producing net benefits for society is at the heart of the discussion of rent capture, and related policy proposals. The more specific principles that rotation and other forest management questions should be decided by a comparison of the costs and benefits of alternatives is central to the discussion of privatization and the regulations now applied to private forest land. The land use decision, and the prescription that those who manage forests should consider the net economic benefits that alternative uses of forest land can yield, is a key consideration in the discussion of privatization as well.

4. An Economic Evaluation of Lithuanian Forest Policy

Selected aspects of Lithuania's forest policy and forest industry are examined next. The choice of topics was determined primarily by the concerns expressed and impressions conveyed in interviews with persons involved in or affected by Lithuania's forest policies. The topics examined are: the current process of privatizing forest land, the use of SFEs to harvest most of Lithuania's timber, and the ability of the present forest financing scheme to generate rent, or net income, on Lithuania's forest lands. The subsequent section, drawing upon this evaluation, presents policy recommendations.

Privatization of Forest Land[14]

Evidence from studies in the U.S. and other countries indicate that private forest lands yield net economic benefits--forest product values in excess of forest growing and harvesting costs--that exceed those realized on government owned and operated forests. These benefits result from the fact that private owners, having a direct economic stake in the net value of products they produce, are motivated to respond to the price signals that markets provide regarding the value of outputs produced and inputs used. A policy of privatizing forests in Lithuania is being implemented at present. The evidence examined,

[14]Information reported in this section comes primarily from Kairiukstis, Kenstavicius, and Markevicius (1994, p. 5), Mizaras 1993a, Lithuanian Institute of Forestry data, Republic of Lithuania, *Forest Sector Development Programme*, Gaizutis and Mizaras 1994, and interviews with Mr. Zuravlas and Mr. Mizaras.

however, indicates that *most of the economic benefits that privatization of forest land could potentially achieve will not be realized by the privatization program now in process.*

The privatization being carried out at present is both slow and limited. Since its inception in 1991, 160,000 ha had been returned through 1994. The total amount is expected to grow to 500,000-600,000 ha eventually. At the average rate of 40,000 ha per year experienced during the first four years, this target will not be reached until 2003-2005. Even if the future rate of privatization is twice this rate, as it was in 1994, the return program will not be complete until the year 1998-2000.

The 500,000-600,000 ha target amounts to 26-31 percent of the land area classified as forest at present. It is argued later that policy makers should seriously consider increasing this share by a factor of two and one-half to three. As of 1994, 8 percent of Lithuanian forests were in private hands and this is not expected to rise above 31 percent. This is far lower than in developed countries in Europe and elsewhere. Private forest land shares are[15]:73 percent in Norway, 52 percent in Belgium, 74 percent in Sweden, 63 percent in Finland, 79 percent in Austria, 68 percent in Spain, 58 percent in Japan, and 73 percent in the U.S. The current share of private forest land in Lithuania (8 percent in 1994) is low even by the standards of other former Soviet republics; Latvia, Estonia, and Poland averaged 18 percent in 1994.

The forest stands being returned to private owners are individually small and generally of low quality for commercial forestry. When the Soviets collectivized forests in Lithuania about 26 percent of forest lands were allocated to collective farms. Forest lands on these former farms were assigned to the Ministry of Forestry and SFEs when the collective farms were dissolved in 1991-1992. These former farm wood lots are the main source of the forest lands being returned. They were generally poorly maintained by Soviet farm managers and are presently less densely stocked with valuable conifers than other SFE lands. The average size of parcels returned is about 5 ha, and most are smaller than 3 ha. The parcels returned generally are not contiguous with other private forest parcels. On maps they appear as small isolated wood lots occurring in land that is generally agricultural. Their small, patchy nature makes commercial forest growing and harvesting more costly than on the contiguous forest parcels the SFEs have retained. The average fixed costs of harvesting on a given site, including negotiations with property owners, acquisition of permits, and logistics, should arguably be higher on small parcels.

[15]These data are from Mizaras 1993a, p. 81.

Also, the isolated nature of these tracts may well imply higher gathering and transportation costs.

The regulations now applied to private forests are structured in a way that continues control by SFEs and the Ministry of Forestry over how they are used after the nominal transfer of title. Some regulation of private use of forests can clearly be justified on economic efficiency grounds, since one owner's actions may confer costs or benefits on other parties. Examples are requirements that private owners: take actions to prevent and control fires and infestations which can spread from one parcel to another, adopt propagation and harvest methods that will minimize erosion into water courses, and make land use decisions that will ensure the health of populations of wild animals.

The regulation now in effect recognizes these potential problems, but goes far beyond and constrains the economic choices of forest owners in spheres that only the owners have a stake in. The following requirements are examples:

1. Each private owner must adopt a forest management program, subject to approval by the local SFE. The plan must include: a division of forest stands into groups specifying the ages of stands of main cutting, and policies for forest protection and replanting.
2. Required cutting ages are specified for individual species in Category IV (commercial) forests: 105 years for pine and ash, 85 years for spruce, 125 years for oak, and 65 years for birch and black alder.
3. By applying the required ages of harvest to a stand's age distribution, a 10 year required harvest is determined. Each year, the rate of annual harvest is constrained not to exceed one-tenth of this 10 year plan. (Some special allowance is made for plots smaller than 3 hectares.)
4. Private forest land cannot be converted to other uses except in special circumstances, such as for farm families who need more farm land to meet family food needs.
5. Licenses to cut on private land must be obtained from SFEs and are good until December 31 of the year issued.
6. The private forest owner must obtain approval from a SFE forester, or other approved forest specialist, in selecting specific areas for clear cutting and even individual trees to remove in selective harvests.
7. Areas cleared by fire or by clear cutting must be replanted with the same species, and satisfaction of this requirement is spelled out in terms of the number of trees planted per ha, e.g., 3,000 oaks per ha, 3,000 spruces per ha, 4,000 pines per ha, and so forth.
8. Areas cleared by cutting or fire must be artificially reforested within two years of clearing.

Clearly, the State, through the Ministry of Forestry and individual SFEs, retains substantial control over how the forest lands returned to citizens are used. These forests are privately owned only in a very limited sense.

It is natural at this point to ask which lands 'should' be returned to private owners, and what regulations can be justified by considerations of economic efficiency? The same principle can guide both choices. Regarding private ownership, the benefits that result stem from the fact that markets provide clear signals to the individual owner on the benefits of taking of certain courses of action, together with incentives to respond to those signals. When the values conveyed by these signals correspond to values enjoyed by society in general, then no regulation or public ownership is needed. Individual self-interest can be relied upon to maximize the value of marketable outputs and services the resource can provide, and to minimize the cost of producing them.[16] For lands used predominantly to produce commercial forest products, for which prices are well established, private ownership can be relied upon.

In cases where private and social payoffs to a course of action do not coincide, state regulation often can be justified. Several examples that pertain to forestry were cited above: control of fires and pests, prevention of erosion and degradation of water quality, and provision of habitat for wild game. Regulations that alter private actions to respond to payoffs that occur to society at large are part of private forest regulation in all developed countries. If such non-private values dominate, so the payoff that a private forest owner can capture is only a small part of its social value, state ownership may be the most efficient course.[17]

These considerations lead to specific recommendations on the areas of forest land that should be privatized. Lithuania's nationwide system of land classification was described earlier. According to the Ministry of Forestry[18] land in Category IV is managed for the sole purpose of continuous wood supply, with allowances for all harvesting methods. *Since the purpose of activity on Category IV land is purely commercial, there is no public interest in having such land owned or operated by the state. Accordingly,*

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[16]Moreover, with access to either domestic or international capital markets, these incentives extend over long time horizons, i.e., immediate sacrifices will be made for long term gains. Private resource owners in developed countries routinely make investments that will not pay off completely for several decades, and such investments are particularly prevalent in natural resource industries such as forestry, petroleum development, and mining.

[17]One might try to accomplish the same end with private ownership and extensive regulation. The ownership achieved in this case would be in name only, however, and would not involve true control over how the asset is used.

[18]Ministry of Forestry, *Lietuvos Misku Istekliai.*1994, Table 3 and accompanying explanation.

policy makers should move toward making all Category IV forest land, which constitutes 77.3 percent of Lithuania's forest, eligible for privatization.

Activities on this land that can cause costs and benefits not borne or captured by the private owner, such as environmental impacts or suppression of forest fires and pests, could be the subject of regulation aimed specifically at these phenomena. *The basic decisions of land use, rotation ages, and management practices that bear on the land's commercial success, i.e., on the net value of outputs it produces for the market, can and should be left to the individual owner, however.*

Land in Categories I-III is managed primarily for non-commercial purposes: Category I is non-commercial natural forest reserves; Category II includes ecosystem reserves and recreation areas; Category III is land kept for protection of soil and air resources, and for green belts for local populations. All of this land serves non-commercial purposes, and presumably generates benefits that a single private owner could not capture by marketing its products and services. Accordingly, there is no clear reason for considering privatization of this land (22.7 percent of Lithuanian forests) at present.

An Economic Appraisal of State Forest Enterprise Operations

With minor exceptions, such as the operation of national parks and scientific establishments which account for only a small fraction of employment and costs, the Ministry of Forestry and its SFEs are commercial enterprises, engaged in producing a product for the market. Indeed, over 77 percent of SFE land is classified for commercial wood production only. There are several reasons why it is appropriate to consider the economic viability of these organizations. These enterprises control a very large share of the entire land area of the Republic of Lithuania. The Republic is presently experiencing profound economic hardships, and opportunities for improving the economic performance of Lithuania's economy should not be overlooked. Further, this is a time of transition, a time when and new ownership and management institutions are being examined in all areas of economic activity. In the appraisal that follows, the criterion applied in judging success is the ability of SFEs to produce *net economic value* for the economy, revenues in excess of the costs of inputs they require.

Net Incomes Under Different Ownership and Institutional Structures

Forest ownership and operation by integrated government enterprises is either rare or nonexistent outside of centrally planned economies and the former Soviet bloc nations now in transition. Side by side comparisons of the economic efficiency of private and

public forest harvesting operations within a single country are therefore unavailable. Comparisons have been made, however, between incomes for 'forest growing' on privately owned versus state owned forest land in West Germany (Grayson, 1993, pp. 139-140). (Harvesting is by private firms on both types of land.) This comparison is of particular interest because German forestry methods are practiced widely around the world, and are sometimes considered a standard by which foresters in other countries measure their own performance. One might think that the application of scientific German forestry practices would produce strong economic performance, regardless of whether a given forest is managed by a state or private organization. This is not the case, however. Grayson reports net income on German forest lands during 1983-1989 for four different ownership classes. The average annual net returns are: 162 DM/ha on private farm wood lots, 91 DM/ha on other private forest lands, 66 DM on forest land owned by communal groups, and 14 DM/ha on state owned forests. Grayson cites the ability of private forest owners to respond to shifting demand and other market changes during the 1970s and 1980s as one reason why private owners were able to maintain positive net incomes while state forests often suffered losses.

Comparisons in the U.S. have shown that forests owned by state and local governments perform much better than forests owned by the federal government. Forests owned by individual states or local governments are used to provide incomes for public education and other government services. Leal (1995) compared incomes, costs, and labor productivities on state versus federal government forests in the states of Montana and Minnesota. In both cases, the forest growing conditions are similar on state and federal land, and the agencies involved follow multiple use, sustained yield practices. Over 1988-1992, State forests in Montana generated $13.3 million in net income, while federal forests in the same region lost $42 million. This was not due to over harvesting on State land, as Montana forest agencies harvested only 8 percent as much timber as the federal agency. It occurred because State agencies consistently achieved higher revenues per unit harvest (often by a factor of two), lower management costs per unit harvest (often by 50 percent), and higher labor productivities (by a factor of over two.) Similar comparisons for forests in Minnesota indicated that the revenue earned per dollar spent on costs was over three times as high on lands owned by the State as on federal forests.

None of these differences reflect environmentally reckless propagation and harvesting methods on State lands, as State operations actually scored higher than federal operations in independent environmental protection audits. The author concludes that State operations are more efficient in part because their managers are obliged to serve the

interests of local populations and because they have a *mandate to earn a profit for their constituents*, i.e., they have an incentive structure that is more like that of a private firm.[19]

The Economic Performance of Lithuanian SFEs

The absence of private forests in Lithuania until 1991 precludes comparisons of the performance of private versus government 'forest growing' at present. One can compare the performance of Lithuanian state forests with private forests in West Germany, however. According to data from the Ministry of Forestry, SFEs produced *gross* revenues of 175,596 thousand Lt on 1,953 thousand ha of forest land in 1994, or 89.91 Lt/ha.[20] Reported *net income*, or 'profit' in 1994 was 18.03 Lt/ha, but it is not known how such cost items as investment, depreciation, or interest charges are incorporated into this figure. For comparison, the average *net* income reported on German private forests (farm and other private forests) in 1983-1989 amounted to 126.6 DM/ha, or 322 Lt/ha using an exchange rate of .39 DM/Lt. This average German *net income* is 3.58 times as high as the *gross income* from Lithuanian forests, and nearly 18 times as high as the Lithuanian net income.[21] For private forests in Sweden Grayson (1993, pp. 209-211) reports a typical before-tax *net* income of 200 SKr/ha in 1992. At an estimated exchange rate of 1.44 SKr/Lt, this amounts to 139 Lt/ha, which is lower than the German figure, but still substantially exceeds the gross income figure on Lithuanian state forests.

Some basis exists for appraising the productivity of labor used in SFEs. It is important to point out, first, that high productivity is desirable because it enhances the value of real goods and services that the economy produces, and thereby raises the incomes of the citizenry in general. High labor productivity is one of the hallmarks of the high living standards now enjoyed by the advanced economies of Western Europe, North America, and the Pacific Rim. Regarding the harvesting activity of SFEs, available data permit labor productivity comparisons between SFEs and one private forest harvesting

[19]Comparisons in the U.S between federally owned versus private industrial forest lands shows significantly different productivities in forest growing (U.S. Forest Service, 1982.) Net annual growth per hectare achieved on industry forests is estimated to be 70 percent higher than on federally owned industrial forests. Part of this difference may be due to differences in land productivity. Compensating for this by comparing actual growth to the biological potentials on private and federal forest land, it was found that growth on private industrial forests was 68 percent of potential versus 40 percent of potential on government owned forests.

[20]Ministry of Forestry, 1994, *Misku Ukio Imoniu 1994 M., Gamybines Veiklos Rodikliai.* These figures exclude revenues and acreage in national park areas and other non SFE operations of the Ministry.

[21]These comparisons are for different time periods, and do not take into account possible changes in prices of timber. In the U.S., at least, log prices were generally constant or rising in real terms over the relevant period, suggesting that German incomes per hectare probably were higher in 1994 than in 1983-1989.

enterprise. Lithuania's SFEs employed 8,658 'commercial workers' in 1994, excluding workers at national parks and scientific establishments. The total volume of timber harvested by SFEs was 2,530 thousand m^3, excluding harvests of SFE stumpage by private harvesters. This implies an average harvesting productivity of .2922 thousand m^3 per worker. Data on output and employment were obtained for Lithuania's largest private timber harvesting firm, Girinis Ltd. In 1994 Girinis harvested 130 thousand m^3 of timber and employed 200 workers, 10 of whom worked in the firm's export operations.[22] For workers involved in harvesting, this implies an average productivity of .6842 thousand m^3 per worker, 2.34 times the average for SFEs.

This productivity difference might be due to differences in stand densities, species mixes, quality of timber, terrain, or proximity to markets. Girinis operates primarily in the Alytus, Kauno, and Plunge SFE regions. To control for possible differences of the types just mentioned, productivities for SFEs operating in these three regions were calculated.[23] The average is .272 thousand m^3 per worker, so Girinis is over 2.5 times as productive as SFEs that operate in the same region.

Another possible source of cost difference is the mix of thinning versus clear cuts in harvests of SFEs versus private enterprises. According to Girinis, the harvest cost per cubic meter for thinning cuts is 50 percent higher than for clear cuts. The SFE timber that Girinis harvests is about 90 percent thinning cuts and data from the Ministry of Forestry indicate that, overall, thinning cuts account for 86 percent of all SFE timber harvested by private firms. Harvests by SFEs on the other hand are primarily clear cuts--thinning accounts for only 37 percent of their volume. Given the higher cost of thinning cuts, the productivity advantage of the private firm would evidently be much higher than the numbers above indicate if both had access to the same mix harvest types.

Possible Sources of Low Productivity in Lithuanian SFEs

This record of low net incomes and low productivities in SFEs naturally raises questions about possible causes. Some clues emerge from available literature on the details of their operations. In a Ministry of Forestry description of harvest methods in SFEs, low average productivity of tractors used in removing timber are attributed to unsatisfactory use of employee time and to tractor repairs.[24] Also, SFEs used 33

[22]Data and other information on the operations of Girinis were obtained by personal communication with A. Buracas, General Director of Girinis Ltd.

[23]Data for this calculation are from Ministry of Forestry, 1994, *Misku Ukio Imoniu 1994 M., Gamybines Veiklos Rodikliai.*

[24]Ministry of Forestry, 1995, "Harvesting Methods in Lithuania--Present Situation and Development Trends," Vilnius.

forwarders in harvesting operations in 1994, but their productivity levels were only half as great as in Sweden and Finland due to lack of worker training, insufficient maintenance and servicing, and inefficient use of workers' time.

Other clues emerge from the 1993 Forest Sector Development Program prepared by a Swedish consulting firm.[25] This report estimates that harvests from SFE lands could be almost doubled over the near future, and tripled thereafter, if more intensive and efficient forest management systems were introduced. Specific management changes put forth include more intensive thinning than is now practiced, starting at an earlier age, and shorter rotations for main cuts. Minimum harvest ages of 85, 75, and 61 years for pine, spruce, and birch, respectively, are recommended, while the Ministry of Forestry now requires respective minimum harvest ages of 105, 85, and 65 years on state and private forest land. According to Kairiukstis et al, typical SFE harvest ages for pine and spruce appear to be even higher. They place average harvest ages at 101-120 years and 81-100 years, respectively.[26]

An additional factor is the deliberate practice of using revenues from SFEs that generate a profit to subsidize the operations of enterprises that incur losses. This practice is a matter of law, as one of the stated purposes of the central portion of the forest fund is to balance profits and losses across enterprises. Using winners to subsidize losers in this fashion runs directly against basic economic principles of efficient management. In forests that are managed for commercial wood production, any enterprise that produces outputs less valuable than the inputs it requires to produce them should not continue to operate--it is a net drain on the economy. This point gains added force when it is recognized that the costs these enterprises actually pay do not include any charge for the forest land they occupy.

In a sense these possible explanations--poor worker training, winners subsidizing losers, and the like--are only proximate causes, outward manifestations of something more fundamental. The following section argues that the existing system of forest ownership and the system of financing for state forest enterprises does not encourage economic efficiency and the generation of net income for the economy.

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[25]Republic of Lithuania, 1993. *Forest Sector Development Programme*, Funded by the Lithuanian Government and the Swedish Agency for Technical and Economic Cooperation (BITS).

[26]Kairiukstis, L., J. Kenstavicius, and A. Markevicius, 1993, *Forest and Forest Products Country Profile: Lithuania*, Geneva Timber and Forest Study Papers, No. 3 (ECE/TIM/SP/3) New York: United Nations.

Rent and Rent Capture on Lithuanian Forest Land

The term 'rent', as used in economics, is the income a resource earns over and above what it costs society to employ it in its current use. Rent can be considered a resource's net social income, whether that resource is land, labor, or equipment. The focus here is naturally on rent earned by land covered by forests. For a forest that is privately owned, part of the rent it generates is the net income received by the land owner. The other part of its rent typically is taken by government in the form of taxes. These taxes, though a cost to the individual owner, are not a cost to society since they amount to a transfer from one segment of society to another. Hence, they form part of the rent the resource earns.[27]

The forest financing system now in place in Lithuania gives managers no incentive to generate net income from their operations. Indeed, the exemption of SFEs from the profits tax together with the 'zero profit' constraint inherent in the operation of all public enterprises virtually prevents the generation of rent for the government. Since SFEs are government agencies, it would be illegal for them to pay out net income from their operations to their managers or workers. Tax payments to government are limited to VAT liabilities. In effect, SFEs are constrained by the method of finance now in place to arrange their operations so that costs and revenues are approximately equal (except for VAT payments.) As a first approximation, Lithuanian forest land generates zero rent for its ultimate owners, the citizens of Lithuania.

It is possible that some of the increased rent this land could earn as wood prices rise to world market levels is being paid to labor employed in SFEs. Although this possibility was not explored in detail, available information indicates that recent wage increases in SFEs have exceeded wage increases elsewhere in Lithuania. According to the publication *Misku Ukio Imoniu 1995* (Republic of Lithuania, Ministry of Forestry, 1995) average wages paid to SFE employees rose from 279 Lt per month to 498 Lt. per month between the beginning of 1994 and the beginning of 1995, or 78.49 percent. The average wage paid to all Lithuanian workers rose only 26.15 percent during the same period, from 323 to 410 Lt per month.[28]

The economic rewards foregone in using the present financing structure appear to be substantial, though it is not possible to estimate them precisely. As noted earlier,

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[27]Contrast the tax paid to the owner's labor expense. Its labor expense does represent a cost to society since laborers employed in the firm's forest operations are unavailable for employment elsewhere in society. Hence, society loses some alternative output when the firm employs labor, and the firm's labor expense reflects this foregone output.

[28]This wage information was provided by Randall Bluffstone, HIID Vilnius.

privately owned forest in West Germany generated net annual income for their owners of 322 Lt per hectare. If Lithuania's existing forest land could earn only one-fourth of this amount per hectare, the total would be over 157 million Lt per year, or 160 Lt per year for a family of four. This income could be used for a variety of social purposes, funding public schools or hospitals, retraining workers to cope with the new employment demands made by transition to a market economy, lowering taxes elsewhere in the Lithuanian economy to make the country's private enterprises more competitive on world markets, or providing a social 'safety net' for those unable to compete in the new economic order.

With privately owned forest land, this income would be shared by owners in the form of after tax income and governments in the form of tax revenue. Significant payoffs from more efficient use of Lithuania's forest lands are, no doubt, possible. It is unlikely that they could be realized without substantially privatizing both the forest harvesting industry and the ownership of commercial forest land in general. While such dramatic changes may occur in the long run, it is appropriate to examine what gains might be possible with more limited policy changes.

5. Short Run Policy Proposals

Three short run policy proposals are offered. Two of these are implicit in earlier discussions, so no detailed explanation or justification is offered here. The third, a proposal for a tax on SFE harvests, is new and is discussed in more detail.

The first proposal is to *accelerate the current policy of privatizing of forest land*. Expansions should include land better suited to commercial forestry and larger forested parcels contiguous with other forest growing parcels. As part of this expanded privatization, the strict controls now imposed on land uses, forestry, and harvesting methods should be pared down to regulate only those activities that involve a social interest, such as an environmental consideration, that is not reflected in the individual owner's own self interest. In the long run, the state should consider making all Category IV forest land eligible for privatization.

The second proposal is to *expand the role of private enterprises in harvesting SFE timber*. Operations of these private firms have expanded rapidly, from nothing in 1990 to 37 percent of total harvests on SFE lands in 1994. Private enterprise harvesters should be allowed to compete against SFEs on an equal footing for harvests on state forest lands. This might be accomplished by awarding responsibility for harvesting an individual

parcel to the SFE only if the SFE can demonstrate that it will add more to the net income of the enterprise (revenue from sales of harvested wood less the SFE's costs of labor and other inputs) than would be earned by auctioning the stumpage to private firms. Obviously, such a policy would require some independent agency to audit cost estimates. It would also require tax changes to allow SFEs and private harvesters to compete on an equal footing.

The third proposal is for adoption of a new tax on harvests by state forest enterprises. The intent of the proposal is to restructure slightly the SFE financing system so that some net income, or rent, is generated from the use of Lithuanian forest land.

A Proposed Tax on SFE Harvests

The tax proposed is a tax on harvested value. It is administratively equivalent to a severance tax, and only slightly different than a yield tax, both of which are commonly levied in the U.S.[29] It is equivalent to a fixed percentage royalty for harvesting government owned timber, a charge that is assessed in several other countries. From an efficiency viewpoint, there are reasons for preferring a tax based on the value of stumpage rather than harvested wood.[30] At present, however, market-based data on stumpage values are observed only infrequently.[31] If the tax were based on stumpage values it would be necessary to estimate them. This process would be time-consuming, possibly arbitrary, and subject to administrative discretion. Reintroduction of the profits tax on SFEs, another possible alternative, is not recommended because the Lithuanian system of financing SFEs does not encourage the generation of profits. An additional consideration is the difficulty of measuring profits accurately in any enterprise.[32]

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[29]Yield and severance taxes are applied somewhat differently in different states of the U.S.. Yield taxes normally are expressed as a fixed fraction of the *value of stumpage*. Severance taxes are normally applied to harvested timber rather than stumpage. They may be expressed as fixed dollar amounts per unit harvested or as a fraction of the value of harvested timber. Severance taxes often are designated for specific purposes.

[30]A tax on harvested timber can cause the abandonment of economically valuable stems in order to avoid their tax liability. A tax on stumpage avoids this problem, since any stem worth harvesting without the tax will still have positive value to the harvester after tax. The abandonment phenomenon is unlikely to be a significant problem in the present case, however, due to the fact that harvests from SFE forests appear to be guided more by biological factors, e.g., norms for scientifically correct forest use, than by economic considerations.

[31]No prices are observed for stumpage harvested by SFEs, which amounts to over 60 percent of all harvests in Lithuania. Stumpage harvested by private harvesters is mainly from thinning operations, and this tumpage is typically sold at administratively fixed prices, not by auction.

[32]An important consideration for a tax on harvests is the proper tax treatment of timber processed in SFE saw mills. Such timber is never sold to an independent entity, so no transaction price is observed. The simplest way to proceed would be to assign a price equal to prices in "comparable sales" of harvested

It is recommended that the tax be imposed on SFE harvests only. Table 2 shows the types of payments made to governments and landowners for harvests on public and private forest lands. All harvests are subject to VAT tax, so VAT payments are not an issue and hence are omitted from this comparison. The only harvests that escape payments (other than VAT) either to government or to land owners are harvests by SFEs. This is one reason for focusing the proposed tax on these harvests. The comparison in the table suggests that the rate applied to SFE land should be higher than the 10 percent applied to harvests from private land, since private forest land is subject to a 1.5 percent annual property tax and also earns some net income for the landowner. The magnitudes of these payments is not known, however, so they cannot be incorporated into this proposal directly.

A second reason for taxing SFE harvests only is to allow private harvesters to compete with SFEs on a more equal footing. Private harvesters who operate on SFE or private lands presently face either a 29 percent profits tax or a 10 percent tax on the value of harvests, while SFE harvesters face neither.

One way to equalize the tax burdens of private and SFE harvesters more precisely would be to extend the 10 percent tax on harvests from private land to harvests from government forest land as well, payable by private and SFE harvesters alike.[33] To eliminate a competitive disadvantage for private harvesters, the 29 percent profit tax they currently pay on income from harvests on SFE land could either be eliminated, or their harvest tax payment credited against it.

An alternative approach would be to set the tax rate at a level that would collect tax revenue equal to the estimated rent, or net income, SFE forest lands are capable of generating. To place private and SFE harvesters on an equal footing, the profit tax liability of private harvesters would either be eliminated for harvests on SFE land, or their harvest tax liability credited against it. A sample calculation using this approach resulted in a harvest tax rate of 8.6 percent.[34] This estimate was based on a very conservative estimate of the rent SFE forests are capable of generating at present, and on assumptions regarding the rates of increase in prices and wages in Lithuania in 1994 and 1995.[35]

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timber--prices actually paid in sales between independent buyers and sellers, for wood of the same species and similar quality, in a recent time period and at a nearby location.

[33]The 10 percent tax is presently applied to individual land owners, rather than companies that harvest. Harvesters often pay the tax as part of their harvesting agreements with the landowners, however.

[34]See R. T. Deacon, "A Proposed Tax on Harvests by Lithuanian State Forest Enterprises," unpublished report, Santa Barbara, CA, 1995.

[35]These calculations should be revised if these assumptions are found to be inaccurate.

Regarding tax implementation, either buyers or sellers of harvested wood could be assigned responsibility for actually paying the tax. The economic burden of the new tax will depend on conditions of supply and demand rather than the assignment of legal liability, so the choice of legal liability can be made to minimize both the cost of administering it and the amount of harvested wood that escapes taxation. Our interviews indicated that there are hundreds, possibly thousands, of small private saw mills in Lithuania, and numerous exporters. This would make it difficult to collect a tax payable by buyers. On the selling side, over 60 percent of harvested wood in Lithuania is sold by the 43 SFEs and the remainder is sold by numerous small private firms. These small private harvesters must obtain harvesting permits from the SFEs, however, so relatively accurate information on volumes and values of wood sold should be available.[36]

Before moving on to compare this proposal to experiences elsewhere, the reason for taxing SFEs should be reiterated. It is to generate some rent, or net income, on the over 2 million hectares of forest fund land owned by the Lithuanian people. At present this land generates no rent for its ultimate owners, aside from payments of VAT taxes. Rather the net income it potentially could earn is dissipated. The forms of this dissipation have not been identified precisely, analysis presented earlier pointed to inefficient practices in SFE forest growing and harvesting operations. It also appears that wage increases in SFEs have exceeded typical wage increases elsewhere in the Lithuanian economy, as explained earlier.

Comparisons to Forest Taxation in Europe

West European countries generally tax forest activities as part of their general system of general taxation. All of the countries examined impose general VAT levies, as does Lithuania, so this tax instrument is common to all and need not be discussed. West European countries generally impose taxes on income from forestry, and on the value of real property (land and buildings), non-land wealth, capital gains, and inheritances. None of the countries examined imposes a flat tax on the value of harvested output, although such levies are common in other countries either as taxes or as royalty payments for harvesting government owned timber.

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[36]It is common for severance and yield tax statutes in other countries to exempt fuelwood used for home consumption from taxation. It is often difficult to determine accurately the volume used and its value, and values involved typically are low relative to wood destined for other uses. Hence, trying to incorporate this component of wood supply in the tax base may be more trouble than it is worth. Also, a policy of providing tax-free fuel to needy rural families may be deemed socially desirable.

Table 3 shows estimated typical tax payments as of 1992, estimated by applying statutory tax rates to typical income and expense levels in individual countries. These estimates, taken from Grayson (1993), apply to forest land owned by individuals and cooperatives of individuals, as opposed to forest firms. This is the ownership pattern most commonly observed in Europe. For comparison the harvest tax proposed here, if imposed in 1994 at alternative rates between 6.9 and 10 percent, would have resulted in tax payments of 6.94-10.05 Lt/ha.[37] The most important type of tax imposed is a tax on the actual or assigned value of forest land. The income taxes imposed in Belgium, France, and Germany use 'cadastral' income as the tax base, and this implies that they are actually land taxes. Cadastral income is an estimate of how much income a parcel of land will yield under good management if it is used for a specific purpose, e.g., growing spruce for commercial timber. A tax rate is then applied to this assigned income to determine a parcel's tax liability, regardless of the income the land actually earns. This amounts to a tax on acreage, with tax rates differentiated by land use and forest species and updated as prices and costs change. 'Land taxes' are explicit taxes on actual or assigned land values. 'Other taxes' include taxes on the value of wealth (levied annually), inheritances, and capital gains.

The range of tax rates shown is huge, but if Denmark is excluded it narrows to 31.57-89.74 Lt/ha, with a mean of 56.95. The approximate 7-10 Lt/ha charge proposed here is less than one-fourth of the lowest of these.

It is important to note that all of the countries examined provide grants or subsidies to defray costs of private forestry, so the tax burdens net of subsidy are less than the values shown in the table. These grant offsets cannot be determined precisely because of the large number of programs in existence and because of differences in the timing of grant receipts in the forest growing cycle. From descriptions in Grayson (1993), grants in Denmark, Norway, and Switzerland appear substantial, although they often are for specialized, non-commercial purposes. In Switzerland, for example, grants are offered for planting and maintenance activities designed to prevent erosion, avalanches, torrents, and so forth. Grant policies in Denmark explicitly exclude payments for such commercial activities as 'normal reforestation' and the planting of conifers. In most of the

[37]SFEs reported revenue of 176.575 million Lt in 1994, excluding operations of national parks and other non-commercial enterprises, and 90 percent of this is assumed to be earned by selling harvested wood or stumpage, as opposed to sales of processed wood, fines, and fees. The resulting revenue is attributed to sales of stumpage, 61 percent, and processed wood, 39 percent. Assuming the sales price of processed wood is twice the price of stumpage on average, and noting that the acreage of SFEs was 1,953 thousand ha in 1994, implies an average revenue from processed wood sales of 100.52 Lt/ha. This is the figure used to estimate the per hectare yields of alternative taxes on harvests.

remaining countries total grant payments amount to a relatively small fraction of forest tax collections--5 percent in Sweden, 17 percent in France, and 20 percent in Belgium. In Germany grants are mainly dedicated to reforesting land the government wishes to withdraw from agriculture and for fertilization programs to offset the effects of soil acidification. Grayson (1993, p. 149) describes Germany's grants to normal forestry as providing a "small element of aid".

Overall, while the form of the proposed tax is unusual in the European context, the tax rate proposed is modest relative to overall tax burdens imposed on forests elsewhere in Europe. Although European countries depend heavily on taxes on the value of forest land, that approach is not recommended here. The primary reason is that the absence of active land markets makes it impossible to determine land values. It presently is illegal to sell SFE land, so prices simply do not exist. Further, it is not possible to infer SFE land value from values of private forest land. This is so because the heavy restrictions now imposed on the use of private forest land, restrictions regarding conversion of forest land to other uses and the rotation ages and management practices that owners of these lands must follow, necessarily reduce their market value.

Experiences and Recommendations Elsewhere

In many ways the relevant comparison for Lithuanian forest policy is not the tax policies applied by developed country governments to privately owned land, but rather the royalty or concession charges levied by developing country governments for harvests of timber on government owned land. That is, the question here is what fee structure to impose on SFEs when they harvest timber from land owned by the Lithuanian government. Gray (1983) has examined the charges and taxes imposed by governments of developing countries that are major wood producers. Most of these are in tropical countries, rather than temperate climates, so the environmental conditions are much different. The institutional context is clearly relevant, however.

Gray offers some general themes or conclusions. One is that forest charges should be based on, and reflect as closely as possible, the stumpage value of timber.[38] For reasons noted earlier this will minimize the tax induced abandonment of timber that is valuable on a before-tax basis. He points out, however, that assessing stumpage values in developing countries can be difficult because active markets in stumpage may not exist and because of the extensive data required to estimate stumpage values from prices of harvested wood and cost factors. As a compromise, he recommends using volume based

[38]Gray (1983, p. 1).

charges that use simplified approximations to stumpage values.[39] This is the spirit of the tax proposal offered here.

The tax proposed for Lithuanian forests is a volume based charge, i.e., a tax per unit of timber harvested, where the base of the tax is the value of harvested output. Harvested output prices clearly do not equal stumpage prices, but the two are highly correlated across species. Thus, the tax would avoid, to a degree, penalizing low valued species and causing their abandonment in the forest. There remains an incentive to abandon individual stems of a given species, either because they are small or because they have high harvest or transport costs. This potential problem is mitigated, however, by the fact that timber harvest methods are heavily regulated. If active markets in stumpage eventually develop in Lithuania, so the market value of stumpage can be determined accurately by species and location on an up-to-date basis, then the tax could be levied against stumpage values instead, with the rate suitably adjusted upward to yield comparable total revenue.

When judged by the amount of revenue raised, charges based on the volume of timber harvested are the most important type of charge assessed in major tropical timber producing countries. Such charges have several names: severance charges, out-turn charges, and royalties are just a few.[40] They are normally set at a fixed rate per unit volume cut, and the rate may vary by species and may be adjusted as prices change. Among the countries that rely heavily on volume based taxes or royalties for timber cut on government land are: Liberia, Ivory Coast, Indonesia, Sabah and Sarawak states in Malaysia, the Philippines, and Thailand.[41]

Finally, the tax proposed here resembles the 'yield tax' commonly imposed in the United States.[42] The yield tax evolved from the property tax levied by local governments, an annual charge on the value of forest land and stumpage. Difficulties in valuing forest land and revaluing land when timber market conditions change led to adoption of the yield tax as an alternative. The yield tax usually is expressed as a fraction of the value of stumpage harvested, and is levied only at the time of harvest. Clements, et al (1986, 31-35) note that yield taxes are levied in most major timber producing states, including Washington, Oregon, Idaho, California, and Louisiana. The tax rates actually levied are not particularly relevant, since yield taxes represent only one of several taxes imposed on

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[39]Gray (1983, pp. 23-24.) He also recommends charges based on 'ground rents' for areas leased to harvesters under concessions. Since the possibility of leasing SFE lands for private concessionaires has not been raised, this charge alternative is not discussed further.

[40]They are termed 'taxes d'abattage' in French speaking countries and 'impuestas forestal' in Latin America.

[41]Examples are taken from Gray (1983, p. 86 ff.)

[42]See Klemperer (1983) and Clements, et al (1986).

U.S. forest lands.[43] U.S. yield taxes are noteworthy mainly for their structure--they are charges based on the volume of harvests--and for the fact that they were introduced to simplify the process of computing tax liabilities. This is the rationale for proposing a volume based tax, levied on the value of harvested timber, in Lithuania.

Summary

To summarize, volume based charges have widespread precedents in timber producing countries. The rate proposed here is well below the range of overall tax rates assessed elsewhere in Europe. The structure of the proposed tax, a volume based charge, has numerous precedents and agrees with United Nations/Food and Agriculture Organization recommendations for forest charges in developing countries. The highly simplified nature of the charge, a tax expressed as a percentage of harvested value, is admittedly blunt. This is primarily due to the absence of active markets in stumpage, or accurate accounting data that would permit stumpage prices to be estimated. When and if stumpage markets become well established, so that prices for specific tracts of stumpage can be estimated with reasonable accuracy, it would be preferable on efficiency grounds to change the tax to a fixed percent of stumpage value, with the rate suitably adjusted to yield comparable total revenue.[44]

Finally, the policy proposal offered here should be considered only an interim measure, aimed at generating some positive net income from Lithuania's forest lands until a more productive set of ownership institutions and operating practices can be developed. The full economic potential of Lithuania's forests will not be realized under the current set of institutions--government ownership and commercial harvesting of the vast majority of all forest land, and relegation to private owners and harvesters of only the least desirable tracts of land and harvest opportunities. To take a step toward realizing this potential, the Republic of Lithuania should look for examples to the developed nations of Western Europe and North America, countries that now dominate world timber supply. The experience in these countries demonstrates that the potential for generating net economic income from forests is best realized when forest managers and operators directly confront the market incentives, the opportunities for profit and the risks of loss, that come only with private ownership.

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[43]Rates vary from 3 to 16 percent of stumpage value, with a mean of 7.8 percent. Other taxes imposed on forest owners include severance taxes and state and federal taxes on corporate and individual income.

[44]An equivalent approach is taken in some countries. The tax is levied on harvested value but the harvester is allowed to deduct administratively determined estimates of per unit harvest costs, differentiated by species and location as necessary.

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Meeting Schedule

Aug. 21	Arunas Kundrotas, Deputy Minister, Ministry of Environmental Protection, General Division
Aug. 21	Ruta Baskyte, Head of Land Management Department, Ministry of Environmental Protection
Aug. 22	Ceslovas Purlys, Ministry of Industry and Trade
Aug. 22	Mr. Zuraulis, Ministry of Forestry
Aug. 23	Balys Baroniunas, Forest Management Institute (Kaunas) Stasys Mizaras, Forest Research Institute
Aug. 23	Mr. Budreckis, Wood Processing Plant (Kaunas)
Aug. 24	Mr. Grikevicius Head, Department of Forest Policy, Ministry of Forestry Rimantas Salkauskis, Head of Forest Control Inspection Mr. Mizeikis, Ministry of Forestry
Aug. 28	A. Sviderskis, President, Concern Wood Industry
Aug. 28	L. Ivanauskas, Director, Lifore Ltd
Aug. 29	Antanas Markevicius, Managing Director of the Association of Lithuanian Woodworking Industry
Aug. 30	Antanas Buracas, General Director, Girinis Ltd
Aug. 30	E. Ryskus, Director, Nemencine Forest Enterprise
Sept. 1	Bronislovas Bradauskas, Minister of Environmental Protection
Sept. 1	Mr. Truskauskas, Secretary of the Ministry of Forestry

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EDP #3. Anil Markandya and Abdul Shibli. "Industrial Control Policies in Asia."

EDP #4. Scott Farrow. "The Czech Republic: Potential Cost Savings From Using Economic Instruments."

EDP #5. Eva L. Ensmann, Ljuba Gornaja, and Bruce A. Larson. "The Pollution Policy 'Cocktail' in Estonia: Economic Incentives and Problems for Implementation."

EDP #6. Scott Farrow. "Comparing Economic and Administrative Instruments: The U.S. Experience."

EDP #7. Randall A. Bluffstone and Theodore Panayotou. "Optimal Environmental Liability Policy for Central and Eastern Europe."

EDP #8. Jeff Vincent, Theodore Panayotou, and John Hartwick. "Resource Depletion and Sustainability in Small Open Economies."

EDP #9. Theodore Panayotou. "Environmental Policy in a Transition Economy: Designing Tradeable Permits for Poland."

EDP #10. Theodore Panayotou. "Effective Financing of Environmentally Sustainable Development in Eastern Europe and Central Asia."

EDP #11. Kathleen Segerson. "Environmental Accidents: An Economic Framework for Policy Evaluation."

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